



31KAX Electronic Air Cleaners

Installation, Start-Up and Service Instructions

INTRODUCTION

Model 31KAX Plate Electronic Air Cleaner is available in three sizes: 012 (300 to 1400 Cfm), 016 (500 to 1800 Cfm), and 020 (700 to 2000 Cfm).

These plate-type air cleaners are designed for use with residential and light commercial forced-air heating and/or cooling systems. They may be installed in a vertical or horizontal section of a typical return-air duct system.

These air cleaners are easily field-converted from right- to left-hand units. Cabinets are designed to support up to 400 pounds when used in under-the-furnace applications.

SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock or other conditions which may cause personal injury or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available. Read these instructions thoroughly and follow all warning or cautions attached to the unit. Consult local building codes and National Electrical Code (NEC) for special requirements.

It is important to recognize safety information. This is the safety-alert symbol Δ . When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury.

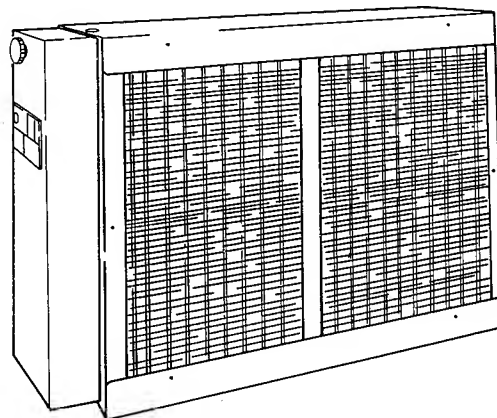
Understand the signal word—DANGER, WARNING, or CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which will result in severe personal injury or death. WARNING signifies hazards that could result in personal injury or death. CAUTION is used to identify unsafe practices, which would result in minor personal injury or product and property damage.

CABINET

The cabinet includes an electrical junction box and a power safety interlock, and houses the air cleaner components. These components are:

1. **Mechanical prefilters**—Expanded aluminum mesh first-stage filter that removes lint and larger dust particles.
2. **Cell assemblies**—Cells consist of combined ionizer and collector.

Ionizer part of cell has tungsten wires (that receive positive charge) mounted between grounded aluminum channels, and supported by glazed ceramic insulators.



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Fig. 1—Model 31KAX

Collector part of cell consists of alternately charged collector plates.

The electronic air cleaner components are (see Fig. 3):

1. A power door assembly.
2. Two prefilters.
3. A cabinet containing two air-cleaning cell assemblies.
4. A parts bag including: electrical bushings, plug buttons, wire chase and airflow label.

Power Door Assembly

The power door assembly consists of:

1. Unit operation light, ON-OFF switch, and door attachment knob—all installed on door cover.
2. Door base plate contains a solid-state power pack that converts 120 VAC to high voltage DC (A240V Conversion Kit, P/N 31KAX900---001-- is available). All wiring mounted internally. A line-voltage disconnect (male plug) and high-voltage bus-bar are mounted on the base plate externally. Four screws must be removed to expose the power pack and wiring.

The supply circuit to the power pack, which is wired across the furnace air blower, is controlled by an ON-OFF power switch. With the power switch ON (assuming power door in place and air blower operating), 120 VAC $\pm 10\%$ single-phase, 60-Hz power is applied to the power pack (240V Conversion Kit transformer converts 240V to 120V AC). Output of the power pack assembly is approximately 7300 VDC.

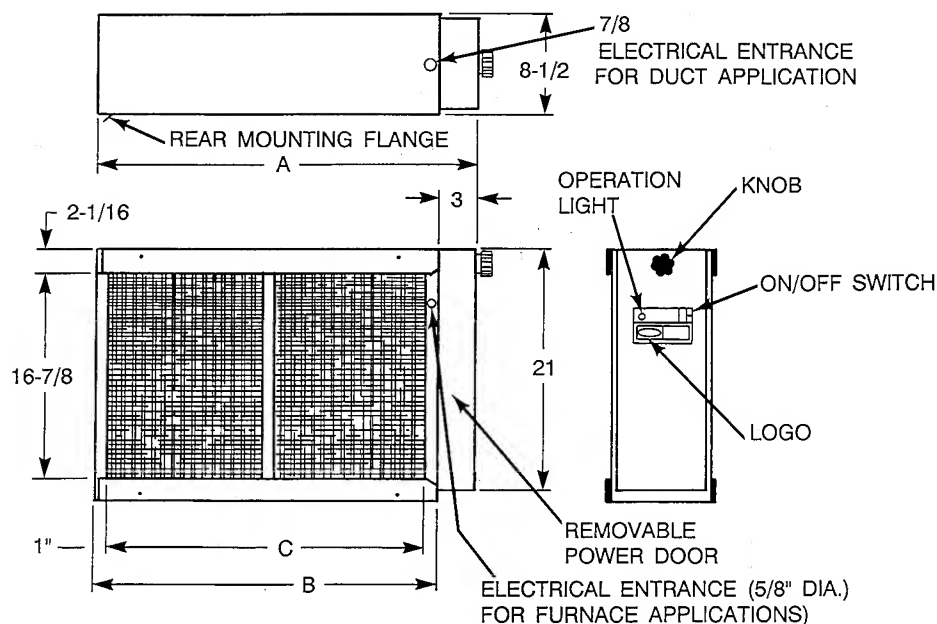


Table 1—Dimensions (In Inches)

Model	A	B	C
31KAX012	24-3/4	21-3/4	19-1/2
31KAX016	27-1/4	24-1/4	22
31KAX020	31-1/2	28-1/2	26-1/4

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Fig. 2—Dimensional Drawing

Table 2—Component Information

Model	31KAX012	31KAX016	31KAX020
Air Volume Range	300–1400	500–1800	700–2000
Electrical Data (input to power door)	120 volts, single phase, 60 Hz	120 volts, single phase, 60 Hz	120 volts, single phase, 60 Hz
Electrical Data (output to collector cell)	120 volts—1.0 milliamps @ 7300 VDC		
Approx Ship. Wt.	120V 50	54	57

Table 3—Pressure Drop At Various Airflows

CFM	31KAX012	CFM	31KAX016	CFM	31KAX020
	Pressure Drop Inches wc		Pressure Drop Inches wc		Pressure Drop Inches wc
300	0.005	500	0.010	700	0.010
400	0.010	600	0.025	800	0.013
600	0.020	800	0.020	1000	0.018
800	0.030	1000	0.028	1200	0.023
1000	0.050	1200	0.035	1400	0.030
1100	0.060	1400	0.045	1600	0.038
1200	0.065	1600	0.065	1800	0.045
1300	0.075	1700	0.070	1900	0.048
1400	0.085	1800	0.080	2000	0.050

NOTE: Using the electronic air cleaner on air duct systems designed for airflows lower than 300 cfm for 012-size unit, 500 cfm for 016-size units, or 700 cfm for 020-size units, is not recommended.

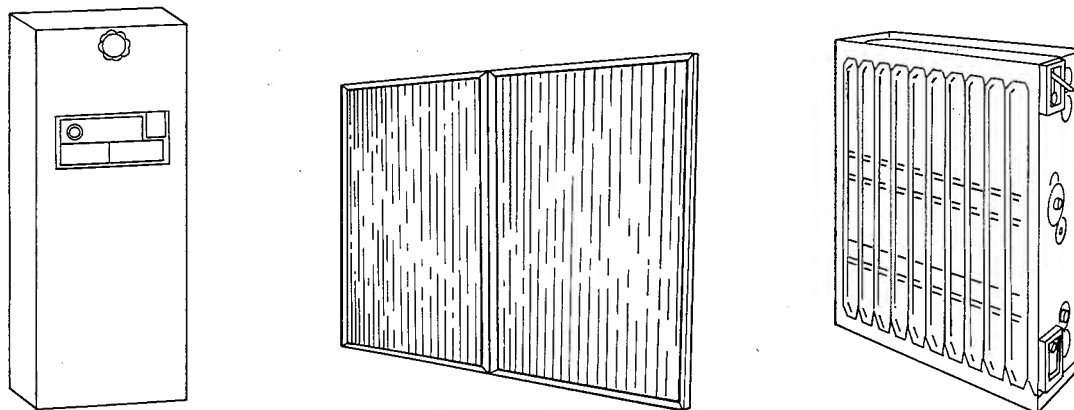


Fig. 3—View of Major Components

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Installation consists of the following:

STEP 1. Locating Unit

STEP 2. Installation

STEP 3. Electrical Connections

STEP 4. Startup and Adjustments

In addition, the following sections are also included:

STEP 5. Maintenance and Routine Service

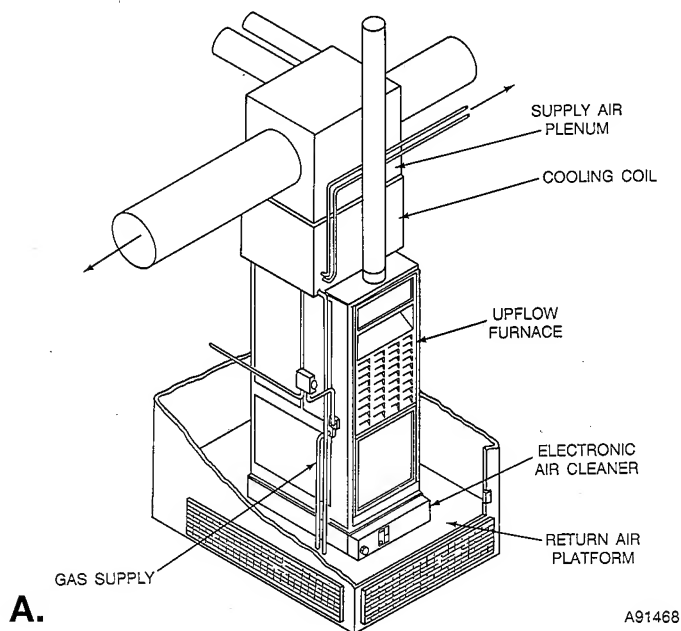
STEP 6. Service Guide

STEP 1. LOCATING UNIT

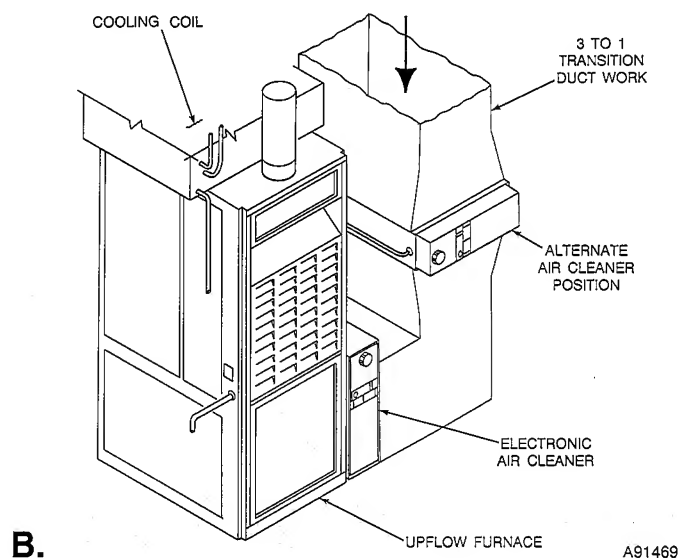
Fig. 4 shows the air cleaner in the return-air duct of some typical furnace installations, with or without air conditioning. Other methods of installing the unit are permissible if the design criteria outlined in this section is observed.

A. Planning an Installation

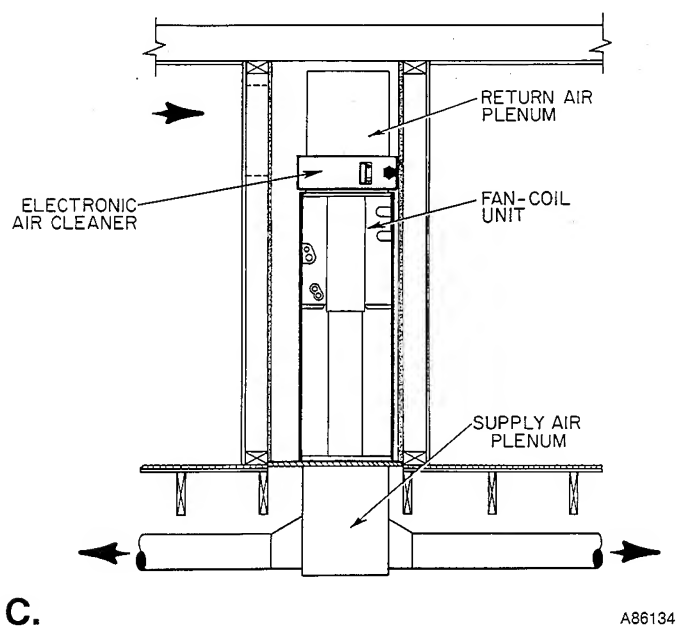
When planning an installation, consider the following:



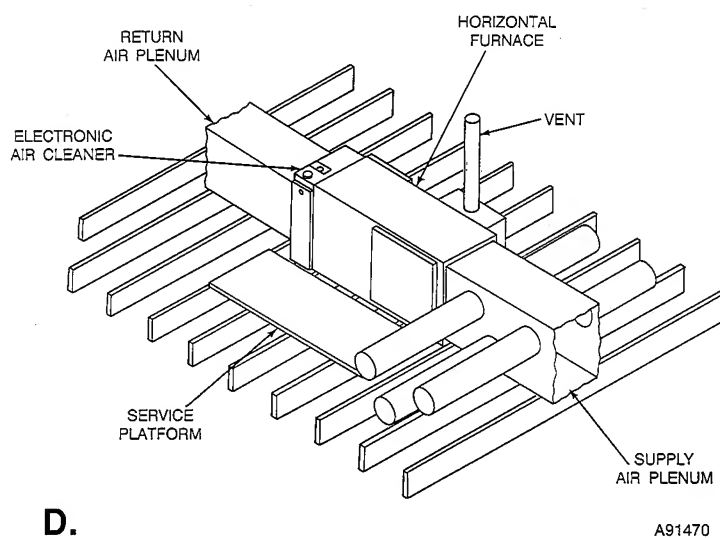
Upflow Application



Furnace Side Application

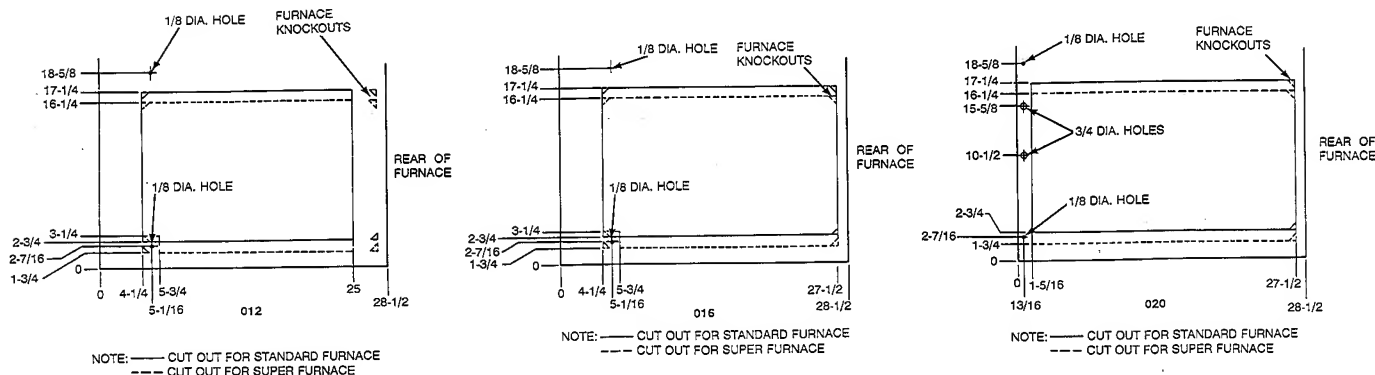


Downflow Application



Horizontal Furnace Application

Fig. 4—Typical Applications



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Fig. 5—Opening Detail

1. Air cleaner is approved only for indoor installation. If outdoor installation is used, unit must be housed in weather-proof enclosure.
2. Air cleaner may be placed in horizontal position on its right or left side or in vertical position on its bottom or back. It must be installed on inlet air side of heating and/or cooling unit. **Be sure that airflow through air cleaner is in same direction as airflow arrows on cells indicate.**

CAUTION

Cabinets will support a maximum weight of 400 lbs when installed beneath a vertical furnace or air-handling unit. When setting furnace on cabinet, do not drop it into place. Position furnace correctly on cabinet to prevent a corner from slipping down and damaging cabinet.

3. Allow minimum of 16 ins. of clearance in front of unit for cleaning and maintenance.

CAUTION

Never use air cleaner to collect grease or other flammable contaminants.

4. Air outlets and returns must not be blocked with furniture, drapes, or other objects.
5. Air cleaner should be installed where all air circulated by system will pass through it.

B. Humidifiers

An evaporative, supply-duct-mounted humidifier may be installed without affecting the electronic air cleaner. A bypass-type evaporative humidifier should be installed so that the moist air does not contact the air cleaner. When an atomizing-type humidifier is used, it should always be installed in the supply-air system.

CAUTION

If an atomizing-type humidifier is installed upstream from the air cleaner, the efficiency of the electronic cells will be decreased by high humidity, salts, and minerals, and service problems will result.

If the bypass-type humidifier must be used upstream from the air cleaner, the following precautions should be taken:

1. Humidifier must be installed as far from air cleaner as possible.

2. A standard, disposable furnace filter must be installed between humidifier and air cleaner to trap water droplets and mineral salts.
3. Electronic cells of air cleaner must be washed frequently to prevent mineral deposit buildup.

C. Outdoor Air

When outdoor air is added to the return-air duct, sufficient heat must be added to maintain the return-air temperature of 40 F minimum or minimum specified by air handling equipment. Temperatures lower than 40 F can cause ionizer wire failure under certain conditions.

NOTE: The maximum operating temperature of the electronic air cleaner is 125 F.

STEP 2. INSTALLATION

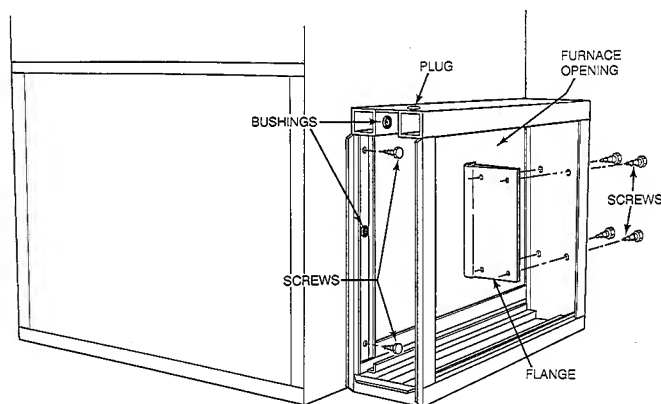
NOTE: See Fig. 4 for suggested installation positions.

CAUTION

Turn off all power to the furnace before beginning any procedures.

Proceed as follows to install electronic air cleaner:

1. Remove and discard existing furnace mechanical filters. They are not required when using an electronic air cleaner. Thoroughly clean blower compartment of furnace.
2. Move ON-OFF switch to OFF and remove power door by rotating knob (approximately 10 turns counterclockwise) until door is free. Grasp power door by knob and remove it



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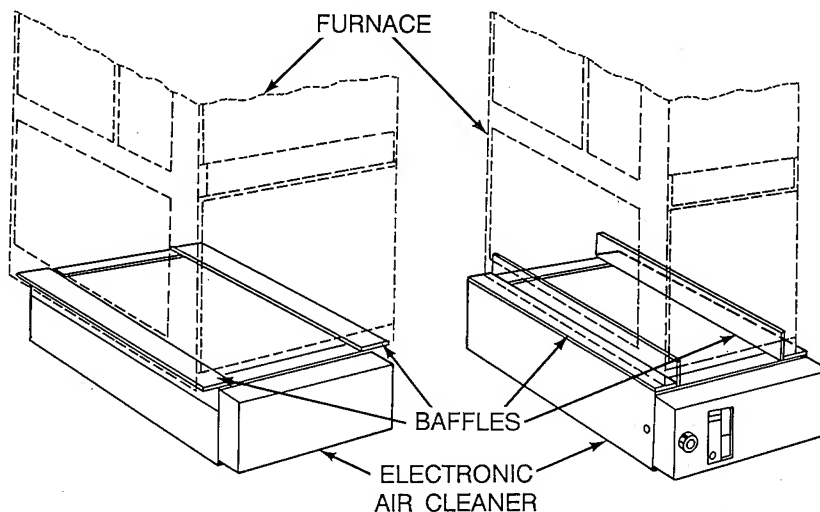


Fig. 7—Installing Baffles if Needed

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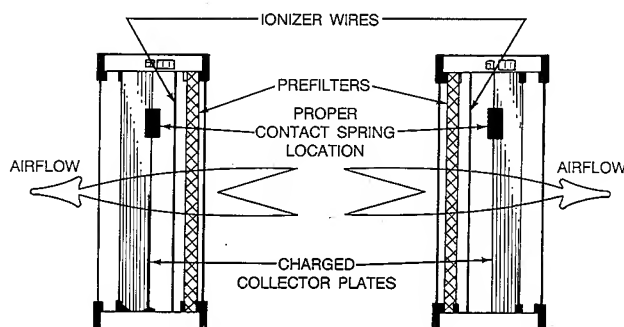
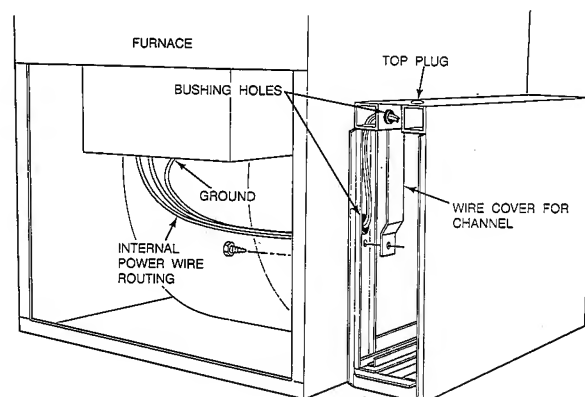


Fig. 8—Reversing Components for Opposite Airflow

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from cleaner casing by pulling it towards you. This motion disengages power supply connector.

3. Slide out prefilters and air cleaner cells.
4. For Model 016 electronic air cleaner furnace side application, cut open return knockout at the side of the furnace cabinet. For Models 012 and 020, cut opening as shown in Fig. 5 opening detail.
5. In order to prevent air leakage, use foam tape provided to attach air cleaner to side of furnace or system blower.

NOTE: The unit is shipped for furnace right side application. For left side application, rotate rear mounting flange 180° by removing (4) screws in the back of the air cleaner. Be sure all four screws are in place after the rotation. Relocate the junction box on the furnace to the right side, if required.

6. Hook back flange into the opening. Use air cleaner cabinet front support flange adjacent to the unit as template and drill two holes on furnace casing. See Fig. 6.
7. Secure the unit with (2) screws using screws provided into drilled holes. See Fig. 6.
8. Prepare return-air duct for installation to unit. Return air must use full cabinet opening. Duct should run straight into unit.

CAUTION

If flanged sheet metal ducts are metal-screwed to the unit casing, do not use screws longer than 1/2-in.

Fig. 9—Line-to-Line Wiring Diagram

CAUTION

Airflow across air cleaner must be uniform for best results. Install turning vanes if air cleaner is installed close to an elbow. Depending on size of furnace, it may or may not be necessary to reduce ductwork on leaving-air side of air cleaner. For any application, maintain a 3-to-1 duct reduction ratio (3-ins. of duct length for every 1-in. of reduction in size).

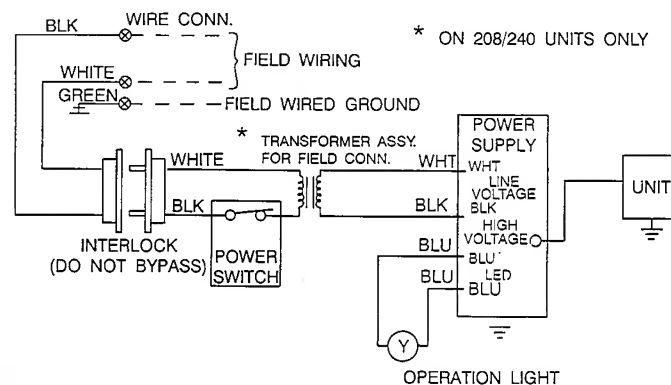


Fig. 10—Wire Routing

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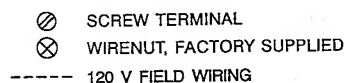
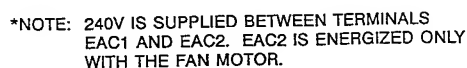
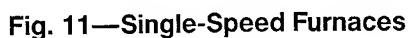


Fig. 15—Fan Coils with Printed-Circuit Control Board

⚠ CAUTION

Do not baffle off any portion of the entering-air side of the air cleaner.

9. Seal all joints on downstream side of air cleaner to prevent infiltration of contaminated air.

STEP 3. ELECTRICAL CONNECTIONS

All wiring must comply with applicable local and national codes. Determine best power wiring routing (see Section A for Internal Connections and Section B for External Connections).

⚠ CAUTION

Be sure all incoming power is off before beginning any procedures.

A. Internal Electrical Connections

Proceed as follows to make internal electrical connections.

1. With power door removed, remove junction box cover adjacent to female plug on casing upper channel.
2. Install protective bushing from inside the air cleaner into the upper hole on the side channel adjacent to the furnace. Be sure bushing projects into furnace opening protecting wires from sharp edges on cabinet opening.
3. Install protective bushing through top rail as shown in Fig. 10.
4. Plug unused hole on top of unit with plug provided in parts bag.
5. Route power wires through bushing channel at top of cabinet, down side channel, and through bushing in side channel and into furnace opening. See Fig. 10.
6. Replace cover of junction box.
7. Install wire cover (provided in parts bag) under top flange and secure to side channel with screw provided.
8. Connect power leads as follows:

Single speed furnaces—Electronic air cleaner is wired in parallel with fan motor. See Fig. 11.

Multispeed direct-drive furnaces—If the air cleaner is wired to a multispeed direct-drive motor, it must be isolated by a relay or sail switch. Use either air cleaner relay P/N P283-1203 or sail switch P/N 69105D1. See Fig. 12 or 13.

Furnaces with printed circuit control module—Electronic air cleaner is wired to furnace terminals EAC-1 and EAC-2. See Fig. 14 for wiring connections.

9. Connect ground wire to base unit ground.

NOTE: For non-corporate furnaces, wire unit using conduit and strain relief the wires.

⚠ CAUTION

Be sure all internal wiring connections are tight before unit is operated.

B. External Electrical Connections

1. Attach power supply conduit to hole in top of electronic air cleaner. Do not use extension cord to connect to electrical power source.
2. Cut electronic air cleaner wires to 6-in. long; strip ends. Connect power leads to black and white pigtailed extending from female receptacle, using field supplied wirenuts. See Fig. 9.

NOTE: Do not connect aluminum conductor to electrical connections of the electronic air cleaner (copper wire only).

3. Connect power leads as follows:

4. Connect electronic air cleaner ground wire (green) to appropriate supply ground.
5. Replace cover of junction box.

Single-speed furnaces. Electronic air cleaner is wired in parallel with fan motor. See Fig. 11.

Multispeed direct-drive furnaces. If the air cleaner is wired to a multispeed direct-drive motor, it must be isolated by a relay or sail switch. Use either air cleaner relay P/N P283-1203 or sail switch P/N 69105D1. See Fig. 12 or 13.

Furnaces with printed-circuit control module. Electronic air cleaner is wired to furnace terminals EAC-1 and EAC-2. See Fig. 14 for wiring connections.

Fan-coil units. Electronic air cleaner (120-v) *must* be wired to fan-coil circuit board terminals EAC-1 and EAC-2 *only* as shown in Fig. 15. Terminals EAC-1 and EAC-2 supply 240-vac. Terminal EAC-1 is energized continuously; terminal EAC-2 is energized only with the fan motor.

C. Final Assembly

⚠ CAUTION

Be sure all field electrical connections are tight before unit is operated.

1. Slide prefilters and air cleaner cells into cabinet.

NOTE: Units are shipped for air entering the right-hand side of the air cleaner. Reverse the position of the prefilter and the air cleaner cells in the cabinet for air entering the left-hand side of the air cleaner as indicated in Fig. 8. Be sure all airflow arrows are pointing in the direction of the airflow through the air cleaner and that the prefilter is on the entering-air side.

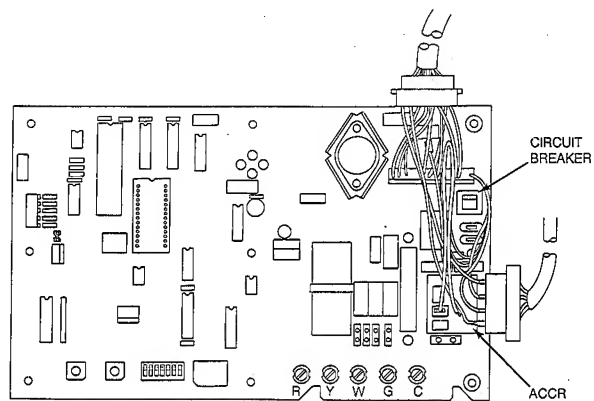
2. Check contact spring location: cell contact springs *must* be relocated for left-hand units. Remove screw holding contact spring to cells and reinstall at opposite end (See Fig. 17). Be sure all airflow arrows are pointing in the direction of the airflow through the air cleaner and that the prefilters are on the entering-air side.
3. Deform prefilter guide on side opposite prefilters so that prefilters may not be reinstalled incorrectly.
4. Replace power door by first inserting bottom tab into place on bottom edge of door opening. Push top of door and guide door attachment knob screw into threads. Turn knob clockwise until screw engages threads in casing. Turn knob clockwise until door is secure. Ensure good electrical contact between power door and unit components.
5. Unit can be installed with airflow through cabinet in either direction. Apply airflow decal (provided) to cabinet, observing actual airflow direction. See Fig. 17.

STEP 4. STARTUP AND ADJUSTMENTS

The electronic components of the unit convert the incoming VAC to VDC power supply. Unfiltered, contaminated air passes through an aluminum mesh prefilter which removes larger airborne particles and distributes the air uniformly across the ionizer-collector assembly. The air passes through the ionizer and is charged with 7300 VDC. The ionizer imparts a positive electrical charge to the remaining contaminants. As the air continues through the collector section, the charged contaminants are attracted to the alternately charged collector plates. The charged contaminants are electrostatically held by the collector, thus purifying the airstream.

1. Ensure that entire electronic air cleaner is clean, dry, and free of foreign objects.
2. Restore power to system.
3. Move ON-OFF switch on power door to ON position.
4. Set room thermostat to start blower.

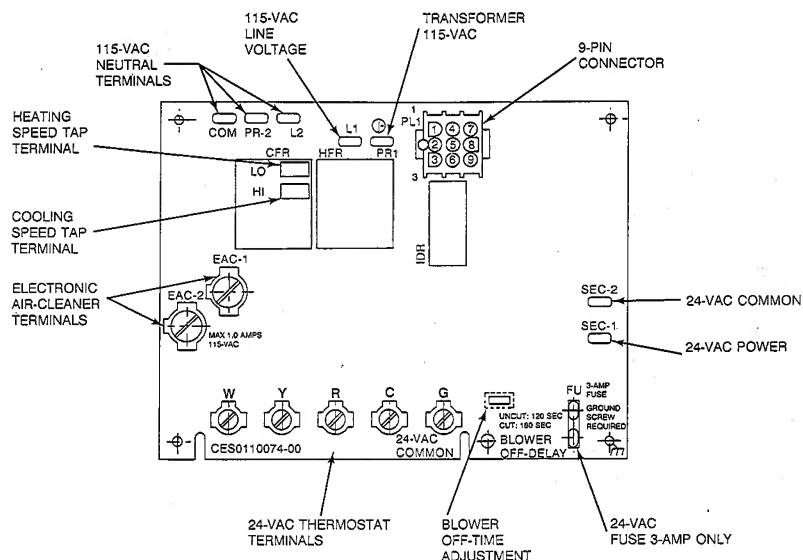
A.



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Corporate Electronic Condensing Upflow Gas Furnace

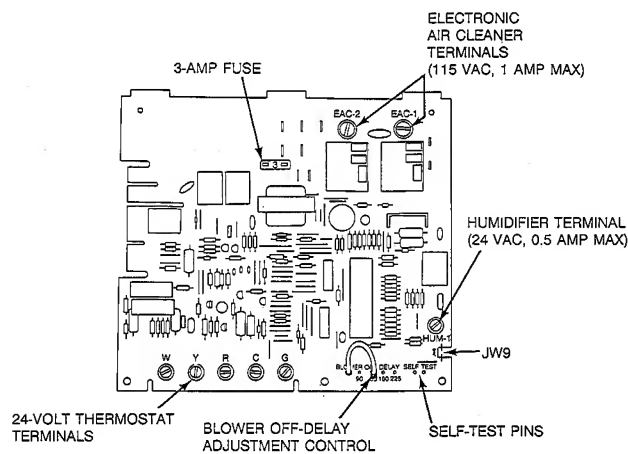
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Corporate Continuous Pilot Gas Furnace

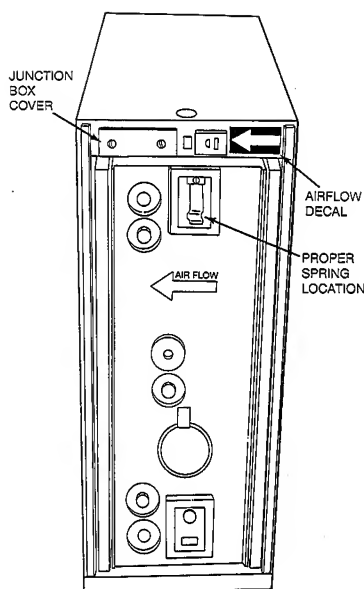
C.



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Corporate Induced Draft and HSI Condensing Furnace

Fig. 16—Internal Furnace Electrical Connections for Electronic Air Cleaners



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Fig. 17—Final Assembly Detail

5. Check to see if operation light is glowing. This indicates proper power to the cells.

NOTE: Leave these Installation Instructions with the owner to enable the owner to perform maintenance and routine service.

STEP 5. MAINTENANCE AND ROUTINE SERVICE

Your new electronic air cleaner requires periodic maintenance for optimum performance. You may perform this service or have your serviceman handle it for you.

Cleaning of the cell assembly and prefilter is required two or three times a year. Frequency will depend on size of home, number of occupants, smoking habits, etc.

The odor of ozone may be noticeable during operation of an electronic air cleaner. A somewhat higher ozone generation rate during the first week or two of operation may be caused by sharp edges on some of the new high-voltage parts. Normal use dulls these sharp edges in a short time.

The odor of ozone is detectable by an average person at levels as low as 0.003 to 0.010 parts per million (PPM). The concentration of ozone produced in a home by an electronic air cleaner ranges from 0.006 to 0.020 PPM. Average concentrations of ozone in the air of major cities range from 0.020 to 0.040 PPM and even higher. This is well above the level produced by an electronic air cleaner.

Because normal maintenance (cleaning) is so simple, most homeowners will choose to personally perform the necessary operations.

Clean the unit where dust from air cleaner cells will not soil carpets or the floor.

⚠ CAUTION

Before removing the electronic cells, be sure to deenergize the system fan to avoid any possibility of circulating unfiltered air back into the system.

To gain access to the prefilter and air cleaner cells, simply push power switch to OFF position and remove the power door. Lay it to one side. Pull out the first-stage prefilters and vacuum from entering-air side, or wash in detergent and water. Let dry thoroughly. Reinstall. Do not spray prefilters with any filter coatings.

A. Cleaning the Cell

For optimum performance, the electronic cells must be washed regularly to remove the dirt cleaned from the air. The required frequency of cell washing varies from one environment to another, depending on a large number of variables. In nearly all cases, the correct period is between 1 and 6 months. Where building infiltration and internal generation of dust is low, as in a smaller home, washing every 5 or 6 months may be adequate. Where there is considerable infiltration, cooking, dust, tobacco smoking, more frequent washing will be required. If a very heavy buildup of dirt is found on the collector plates, or the cell is not clean after washing, it should be cleaned more often. If there is only light dirt on collector plates, the period between washings can probably be lengthened. The electronic plate cells may be washed a number of different ways, depending on homeowner preference.

1. **Automatic Dishwasher Washing**—The easiest and most convenient way to remove the accumulated dirt from the plate-type electronic cells is to wash them in an automatic dishwasher.

- a. Place electronic cells on sides with ionizer section down (airflow arrows pointing up) on lower rack of dishwasher.

⚠ CAUTION

Use care to avoid damage to the collector plates when placing the cells in the dishwasher.

NOTE: For some dishwashers with a center spray arm, it may be necessary to remove the top basket to fit one or both cells inside.

- b. Use detergent in accordance with dishwasher manufacturer's instructions.
- c. Allow dishwasher to run through its complete wash cycle. You may also allow it to run through its complete dry cycle, although this is not necessary.

⚠ CAUTION

The electronic cell will be very hot at the end of the dishwasher's cycle. Allow it to cool before handling. Hot water may accumulate in the tubes supporting the collector plates. Tip the cells so that these tubes will drain.

- d. Dry cells completely before turning on power to air cleaner. This can be done by replacing cells in cabinet and letting fan on system furnace or air handler run approximately 30 minutes before turning on power to air cleaner.
- e. With some dishwashers it may be necessary to rerun complete cycle or rinse cycle after cells are removed if homeowner notices dirt stains or residue inside dishwasher.
2. **Manual Washing**—The electronic cells may be washed manually by soaking them in a solution of automatic dishwasher detergent.
 - a. Provide suitable container large enough to hold one or both cells.
 - b. Select automatic dishwasher detergent that dissolves readily in hot water. Depending on local water conditions, some brands may form a precipitation or scum. If a noticeable scum floats to surface, try another brand. The brand the homeowner finds gives the best results in his dishwasher will probably give best results washing the electronic cells.

⚠ CAUTION

Do not splash detergent solution in eyes, and avoid prolonged contact with skin. Keep detergent and solution out of reach of children.

- c. Before placing cells in washing container, pour in detergent. Use approximately 3/4 of cup per cell if container is about size of cell. Add enough very hot water to cover cell or cells.
- d. After detergent has completely dissolved, place electronic cell (or cells) in container.
- e. Soak cells for 15 to 20 minutes, slosh several times, and remove.
- f. Rinse cells with fine water spray.
- g. Fill wash container with clean, hot water and soak cells for 5 to 15 minutes.
- h. Remove cells and let water drain from them. If water draining from them feels slippery, detergent still remains. Repeat rinsing until water from them no longer feels slippery. Inspect for cleanliness.
- i. When both cells have been washed and thoroughly rinsed, check cells for broken wires and bent collector plates. If none are found, replace electronic cells and prefilter in cabinet. Observe proper airflow arrows on cabinet and cells.
- j. Dry cells completely before turning on power to air cleaner. This can be done by letting fan on system furnace or air handler run for approximately 30 minutes before turning on power to air cleaner.

STEP 6. SERVICE GUIDE

⚠ CAUTION

Procedures in this section should be performed only by qualified service personnel.

⚠ CAUTION

1. During troubleshooting procedures, dangerous line-voltage circuits are exposed. Use care to avoid hazard of electrical shock or damage to equipment.
2. Although not lethal, high-voltage output of power supply can produce painful shock.
3. Be sure to properly ground air cleaner and its components before testing.
4. Do not touch any portion of air cleaner when energized.

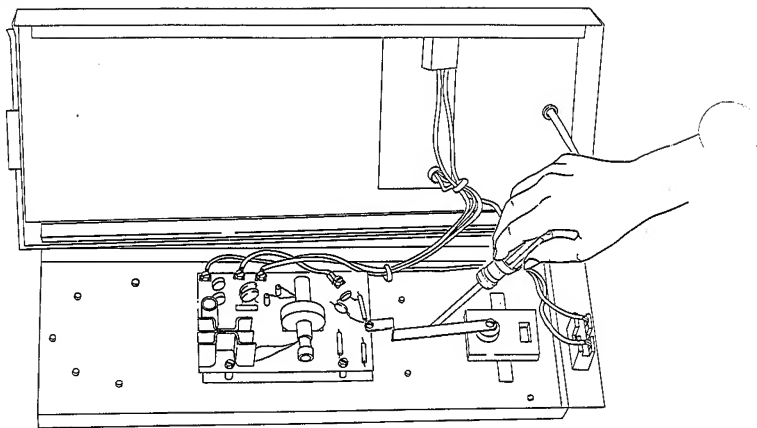
Tools and Equipment

Servicing the electronic air cleaner can be accomplished with only a few tools:

1. Screwdrivers: Long shank, plastic or rubber handles (two required).
2. Needlenose pliers for stringing ionizing wires.
3. High-voltage jumper cord.
4. High-voltage tester: range to 12 KVDC.
5. Grounding wire.

ELECTRICAL TROUBLESHOOTING GUIDE

The following troubleshooting procedure is a simplified approach to aid the serviceman in repairing any malfunction in the electronic air cleaner. By following this troubleshooting procedure, and operation light, the malfunction can be isolated to certain areas in the electronic air cleaner.



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Fig. 18—Checking 120-Volt Power Pack
NORMAL OPERATION

For normal operation of an electronic air cleaner, the system blower should be running and the air cleaner switch should be "ON." This will allow the unit to be energized and cause the light on the power door to glow. Occasional arcing by an electronic air cleaner is normal (the light on the power door will flicker). This can result when lint or large particles of dirt are not stopped by the prefilters. The dirtier the electronic air cleaner becomes, the more likely occasional arcing will occur. Continuous arcing may indicate cleaning is necessary. (See cleaning procedures.) The electronic air cleaner should operate only when the system blower is running.

ISOLATING MALFUNCTIONS

Switch on the electronic air cleaner and energize the blower system. (See operation of an electronic air cleaner.) If the light does not glow, remove the cells and replace the door. If the light glows with the cells removed, the problem is within the cell or cabinet. Proceed to steps 1 thru 3. However, if the light does not glow, proceed to steps 4 thru 10.

It may be necessary to perform steps 1 through 3 after completing steps 4 through 10 if there was a malfunction in both sections.

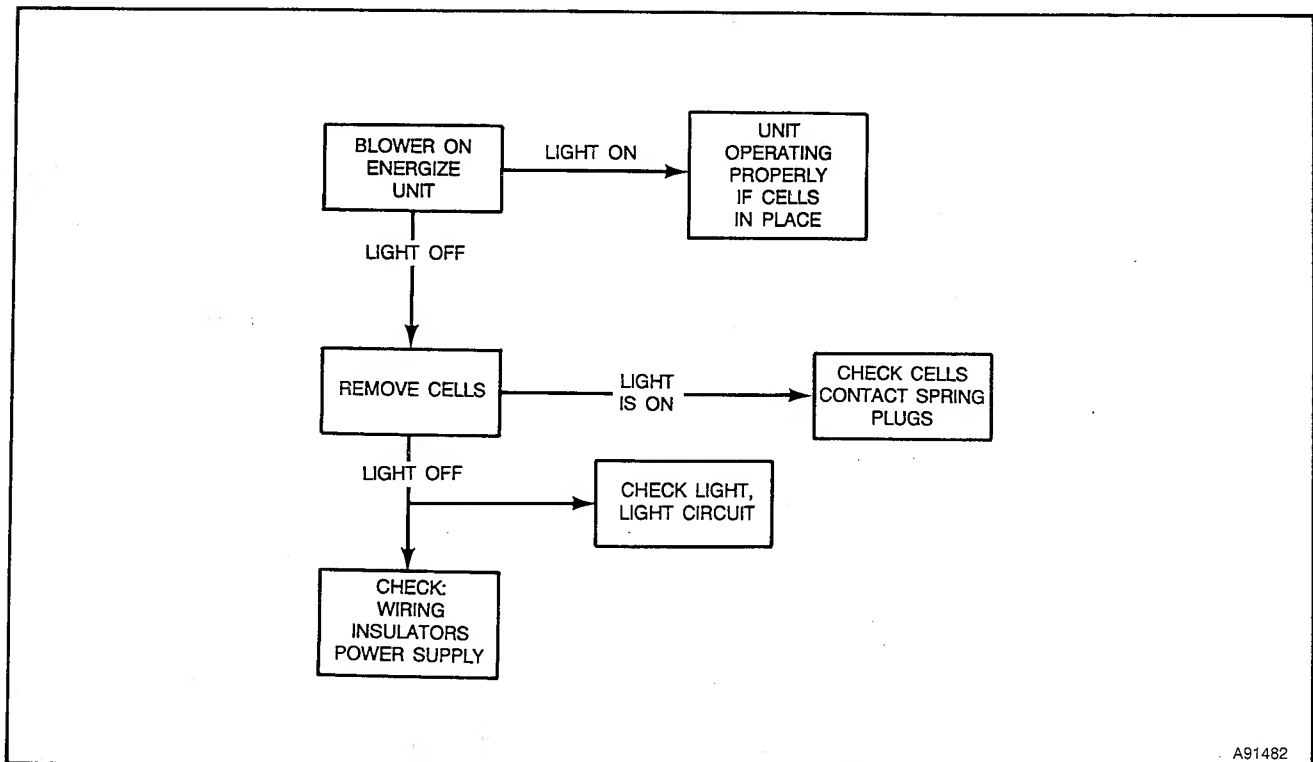
1. Check spring on cell to see if it is bent, sprung, or deformed. Check to see that it makes good contact with door. (Repair or replace.)
2. Check male and female plug and receptacle and associated wire connection on power door and cabinet for damage and proper wiring.
3. Check air cleaner cells, visually inspecting for:
 - a. Heavy dirt accumulation (Wash cells—see cleaning procedures).
 - b. Bent collector plates (Straighten).
 - c. Broken ionizer wires (Replace).
 - d. Ionizer springs broken or bent (Replace).
 1. Check to see that ionizer springs are seated properly in place. Improper seating may cause arcing.
 - e. Insulators cracked or broken (Replace).
 1. Deterioration of metal around insulator indicates defective insulator (Replace insulator).
 - f. Ionizer grid deformed (Repair or replace).

Check for short between high-voltage contact (found in center of rectangular ceramic insulator) and frame of cell, with ohmmeter. Resistance should be infinite. (open circuit)

If the light does not glow when cells are removed:

4. Remove power door from unit and check for power to air cleaner cabinet. This can be accomplished with a volt meter. Being careful to avoid electrical shock, check out-

ELECTRICAL TROUBLESHOOTING FLOW CHART



put at the receptacle with voltmeter. Reading should be approximately 120 volts (240 for 240V conversions).

During normal operation, power to the cabinet should only be activated while system blower is operating. DO NOT operate electronic air cleaner when blower is off, to avoid building up an undesirable concentration of ozone.

5. Remove access panel on power door and visually check to see that all wire connectors are firm and that wires are not broken. (Repair or replace with 18-gauge wire minimum.)
6. Inspect ceramic insulators for dirt or damage. (Clean or replace.) Deterioration of metal around insulator indicates defective insulator (Replace).
 - a. Inspect for visual damage (Replace.)

⚠ WARNING

A possible shock hazard exists. Do not allow arcing for a prolonged period of time. The power supply output can be checked with a high-voltage voltmeter. The output should read between 9000 and 11000 VDC. If the output is below 7500 VDC, replace the power supply.

7. Check switch and light circuit by applying electrical power to plug on power door. This can be accomplished with jumpers from cabinet receptacle. Attach grounding wire between power door base and cabinet.

⚠ WARNING

A possible shock hazard exists. Be careful not to short out the power supply. The buss bar and contact plate carry live high voltage current on - 7300 VOC, 1 MA

The L.E.D. light circuit output can be checked with a voltmeter. The reading should be 4VAC.

8. Check power supply. (See Fig. 18.)
 - a. Place screwdriver on ground plate (access panel) and at same time move shank portion of screwdriver towards high-voltage output of power supply. If arcing occurs when screwdriver comes within approximately 1/8 in. of power supply, then power supply is operating properly. If no arcing occurs, power supply is defective. (Replace power supply.)
 - b. Use high voltage tester. Voltage output should be between 9000 and 11000 VDC.

TROUBLE ANALYSIS CHART

PROBLEM	POSSIBLE CAUSES	REMEDY
Operation light off	Shorted cells	See "Electrical Troubleshooting Guide" section.
	Defective light	
	Defective power supply	Energize blower.
	Blower not operating	
Unit snaps or arcs continuously	Cells wet either due to high humidity or from washing	Cells will dry.
	Line voltage too high	Adjust line voltage.
	Cells need cleaning	Clean cells.
	Broken ionizer wire	Replace wire.
	Broken contact spring on cell	Replace spring.
	Broken insulator in cell	Replace insulator.
	Broken insulator in power door	Replace insulator.
Humming noise	Foreign material lodged in ionizer or between plates	Remove object.
	Bent plates	Straighten.
	Improper wiring connections	Correct.
	Loose ionizer wires	Replace or repair.
	Ionizer wires not centered	Center wires between plates.
Air cleaner does not clean dirt	Excessively dirty ionizer or collector	Clean.
	Deformed contact spring on cell	Adjust spring.
	Lack of power to cells because of improper alignment of contact spring cells to power door	Adjust alignment or replace spring.
	Defective interlock plug or receptacle	Replace.
	Air volume too great	Reduce air volume to design CFM.
	Leaks in ductwork on clean air side of air cleaner	Seal.
	Dirty air not being delivered to air cleaner	Check return-air grilles for obstruction by furniture, drapes, etc. Remove.
Radio or TV interference	Uneven air distribution across face of unit. Uneven air distribution across face of unit may be indicated by uneven loading pattern of dirt in collector section of air cleaning cells. The entering-air side of collector stage should be evenly covered with dirt. In the case of the two cell units, each cell should have an even loading pattern.	Install turning vanes of air baffles. CAUTION: Do not block off any of the entering-air side opening to the unit.
	Accumulation of foreign particles lodged in ionizer section	Remove.
	Unit improperly grounded	Provide good ground to power pack.
	Ground line of supply line voltage not properly grounded	Correct.
	Loose ionizer wires	Replace.
	Loosely connected components or primary-voltage wiring	Tighten.
	Defective power pack	Replace.
	Dents in collector section or ionizer section	Straighten.
	Improper contact between power door & cells	Adjust alignment of contact spring.
	Weak-station/poor ground	Add E.M.I./R.F.I. filter in power line.
White dust on furnishings	Defective insulator	Replace.
	This dust can be described as "clean dirt" and is composed mainly of lint, which because of its weight settles out of the living space before it reaches the air returns. It is "white" because the submicron dirt particles, which normally would color it and render it invisible, have been removed from the air space.	This problem requires no solution. It is visible evidence that the air cleaner is cleaning up the staining and soiling dirt particles from the living space.